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Default Risk for Alternative "Deferred Interest" Mortgages

by

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EXECUTIVE SUMMARY

1. Price-level-adjusted mortgages (PLAM's), graduated payment mortgages (GPM's), variable rate mortgages (VRM's) with graduated payments, and - in a slightly different way - shared appreciation mortgages (SAM's) take as their point of departure the supposed tendency for house prices to track the inflation rate quite closely.

2. Examination of the housing price data compiled for the period 1974-1982 by the Royal Trust indicates that, over six month periods, the correlation between price movements in local housing markets and the inflation rate is weak or non-existent. In addition, mean rates of appreciation and period-to-period variability of prices differ sharply across the local markets.

3. Simulations based on the counterfactual assumption that price movements in all housing markets exactly equal the inflation rate indicate, not surprisingly, that default risk for all the "deferred interest" mortgages cited above is not large. Default risk is proxied by simulated loan-to-value ratios, over time, for the alternative mortgage designs, including equal payment mortgages (EPM's).

4. Simulations based on price behavior in five local markets (Vancouver, Toronto, Saskatoon, Mississauga and Fredericton) produce quite different results. Highlights include the following observations.

   (1) In spite of the high mean rate of appreciation in Vancouver, the substantial period-to-period variability in prices is such that default risk may be significant <u>even</u> for an EPM. The <u>additional</u>

default risk of "deferred interest" mortgages in this type of market need not be large.

(2) By contrast, the period-to-period stability in prices in Fredericton implies that default risk for EPM's is small. The low mean rate of appreciation, however, implies that PLAM's, GPM's, and VRM's with graduation are risky, especially as time elapses. In general, the additional default risk of "deferred interest" mortgages relative to EPM's will be greatest in markets where house prices are not volatile and mean rates of house appreciation are significantly lower than the inflation rate.

(3) Of all the "deferred interest" mortgages, default risk is in general moderate only for SAM's. This is due to the fact that the numerator in the loan-to-value ratio (by virtue of the lender's claim on a designated fraction of the nominal price appreciation of the mortgaged property) tends to be positively correlated with the denominator (the nominal price of the mortgaged property).

(4) Because price behavior in the local markets differs so sharply, it is not possible to define a stable tradeoff between (say) initial loan-to-value ratios and the degree of graduation such that default risk remains fixed at some predetermined level. The terms of any such tradeoff, in addition, change as time elapses from the date that the mortgage was taken out.

5. The study thus draws attention to the crucial variable omitted in many discussions of "deferred interest" mortgages: that is, price behavior in local housing markets and the weak correlation - at least over 6 month intervals - between these prices and the overall inflation

rate. The results indicate that any nationwide insurance premium is likely to involve substantial cross-subsidies. The results also draw attention to the probable importance of altering other design features of "deferred interest" mortgages - such as the amortization period and the degree of interest capitalization - to reduce default risk.

6. The results presented in this study are for a "pure" PLAM, in which there is 100% capitalization of the inflation adjustment. If only partial capitalization of the inflation adjustment is permitted, the increase in default risk of PLAM's relative to EPM's in local markets such as Fredericton may be quite small. This point, together with differences in simulation methodology, "reconcile" the results presented in this study with the study (Appendix B) conducted for the Lortie Commission.

Introduction

The purpose of this study is to estimate the likelihood, at each point in time, that the (market) value of the mortgage will exceed the market value of the mortgaged home. To this end, stochastic simulations are conducted for five types of mortgage instruments:

(1) equal payment mortgage (EPM)

(2) graduated payment mortgage (GPM)

(3) variable rate mortgage (VRM), including a dual rate VRM provided by the Canadian Imperial Bank of Commerce

(4) price level adjusted mortgage (PLAM)

(5) shared appreciation mortgage (SAM)

If the (market) value of the mortgage exceeds that of the property, then the owner's equity is zero. This fact is of particular interest to those who are concerned with setting insurance premiums. For novel mortgage instruments, experience rating is not possible. Stochastic simulations thus represent a potentially important input into the setting of insurance premiums, as well as in the design of mortgage instruments eligible for insurance. Prior research has established that other factors, including the "burden" of mortgage payments as measured by the ratio of carrying costs to the borrower's income, do influence the probability of default (Vandell (1978), Webb (1982)). Our exclusive concern with the loan-to-value ratio (L/V ratio) is justified by the fact that, in a well functioning capital market, default should not occur so long as the owner's equity is positive. If the owner defaults when his equity is positive, and absent transactions costs, the insurer is protected. To the extent that the actual costs of foreclosure and resale are not negligible, the insurer need be concerned if the L/V ratio

exceeds a target level which is less than one. This fact explains our desire to illustrate, through stochastic simulation, the probability that L/V ratios will exceed designated levels at different points in time after the mortgage has been taken out.

To conduct the simulation experiments, we must estimate stochastic processes to describe the behavior, over time, of three key variables:

(1) the rate of inflation

(2) the (nominal) rate of interest

(3) the relative price of housing (i.e. relative to the general inflation rate)

We first simulate the behavior of L/V ratios over time under the simplifying assumption that there is no relative price risk; that is, under the assumption that the price of all homes rises exactly at the inflation rate. This simplifying assumption allows us to highlight certain features of the alternative mortgage designs, and accords - loosely - with the popular view that housing is a good "inflation hedge". We then relax this assumption and allow the price of housing in different geographical areas to diverge from movements in the general price level. To guide this portion of the simulation experiments, we first examine carefully the data for the period August 1974 to February 1982 contained in the Royal Trust Survey of House Prices. Because of the importance of this input to the simulation exercises, and due to the perhaps surprising nature of our empirical findings, we discuss these results at some length in the text.

The report is organized into five sections. In the first, we present and discuss our stochastic representations of the inflation and interest

rate series. In the second, we examine the housing price data compiled by the Royal Trust. In the third, we present the simulated L/V ratios for the alternative mortgage instruments under the assumption that there is no relative price risk. In the fourth section, we present the simulated L/V ratios when the relative price of housing is permitted to vary. To do so, we are guided by the behavior of housing prices in Vancouver (two types of housing), central Toronto, Saskatchewan-Regina-Winnipeg, Fredericton-St. John's-Saint John, and Mississauga. These six markets are likely to be representative of the variety of local housing markets in Canada, and serve to highlight the potential variation in relative price risk. In the fifth and final section, we summarize the implications of our findings for the general problem of designing and insuring "deferred interest" mortgage instruments.

1. The Stochastic Processes for the Inflation Rate and Nominal Interest Rates

After some experimentation, we chose the following process for the six-month inflation rate:

$$\pi_t = \underset{(1.17)}{0.1166} + \underset{(2.18)}{0.2893}\,\pi_{t-1} + \underset{(4.46)}{0.5995}\,\pi_{t-2} + \varepsilon_t \qquad R^2 = .697 \quad D.W. = 1.71 \quad (1)$$

$$\sigma_\varepsilon = 0.0104$$

semi-annual, 1961:1 - 1980:2

π_t = the consumer price index divided by its level six months earlier

Bracketed figures are t-statistics.

The inflation rate thus exhibits second order serial correlation, the process has a standard deviation of 0.0104 (and an in-sample mean of 1.0309), and

the implied steady state value is 4.86 percent (or 9.96 percent at an annual rate).

We chose the following process for the nominal interest rate (R_t), as measured by the chartered banks' prime business loan rate:

$$R_t = \underset{(0.08)}{0.0063} + \underset{(7.59)}{0.7314}\, R_{t-1} + \underset{(3.01)}{0.2666}\, \pi_t + u_t \qquad R^2 = .818 \quad D.W. = 1.98 \qquad \sigma_u = 0.0079$$

semi-annual, 1960:2 - 1980:2

The nominal interest rate exhibits first order serial correlation, is influenced by the contemporaneous inflation rate, and has a steady state value of 6.67 percent (and thus corresponds to an annual rate of about 13.85 percent). Because of the reduction in the term to maturity of conventional mortgages, as well as the emergence of VRM's tied to the prime loan rate, this short-term rate was deemed to be the most appropriate for the simulation experiment.

The simulation experiments each consist of 200 trials. The inflation and nominal interest rate processes are initialized at their values on April 1982, or at 10.5 percent and 17 percent per annum. The means and standard deviations of these two series, as they evolve over time, are presented in Table 1. The salient features for the simulation experiments are as follows. First, the mean inflation rate declines slightly over time, due to the fact that the initial value of the inflation rate exceeds the steady state value. The same is true, although more pronounced, for the nominal interest rate. (Note also that the implied real interest rate declines over time.) The decline of the nominal interest rate affects the simulated L/V ratios in a perhaps unusual way. Because of the decline on average

in the nominal interest rate, the market value of EPM's, GPM's and SAM's on average rises since their nominal payments streams are fixed in advance for designated lengths of time. As a result, L/V ratios increase on this account when the market value of these mortgages are used in the numerator of this ratio. This result ignores the existence of prepayment privileges, typically subject to penalty, which in fact exist on such mortgages. The rise in the market value of these mortgages, whose payments are initially fixed for a 5 year period, would be bounded above by the book value of the mortgage (i.e. the principal outstanding at each point in time as calculated in the original loan agreement) if prepayment penalities did not exist. Rather than provide a detailed analysis of prepayment privileges, we chose to calculate the L/V ratio twice for EPM's, GPM's and SAM's: once with the market value of the mortgage, and once with the book value. Both results are presented for the case in which there is no relative price risk. Only the results with book values are presented when we analyze the more relevant case of relative price risk.

Note that the dispersion of inflation and interest rates, as measured by their standard deviations, rises for the first 20 observations (i.e. 10 years) or so. This is due to the serial correlation in the inflation and interest rate processes. The convergence of the standard deviations reflects the stationarity of the processes. Note also that it is possible, through changing the constant terms or the coefficients of the lagged variables, to restructure the simulations so that the means of the two series remain at their initial levels. This would be appropriate if one believed that the high initial values of these series were likely to persist. We chose not to extend the simulation experiments in this direction, although we could readily do so.

2. The Analysis of the Relative Price of Housing Using the Royal Trust Data

Since August 1974, the Royal Trust has surveyed three times yearly the prices of two standard houses (a three bedroom bungalow and a 2 storey, four bedroom house) in a variety of cities and centers in Canada. Prices are estimated by real estate personnel of the Royal Trust on the assumption that the homes have no mortgage financing. As of February 1982, price data were compiled for more than 130 cities and centers. To place some limit on our task, we examined in detail data on the prices of both homes in seven geographical markets:

(1) Vancouver
(2) Edmonton/Calgary
(3) Saskatoon/Regina/Winnipeg
(4) Central Toronto
(5) Mississauga
(6) Quebec City/Montreal
(7) Fredericton/Charlottetown/St. John's/Saint John

Because of our desire to work with semi-annual observations, the Royal Trust data were used to construct semi-annual observations of the rate of increase in house prices in the indicated markets. Each of the house prices in (1) to (7) is a value-weighted average of its constitutent parts. For the period 1974-1982, 15 observations were available on each house price. We must also point out that each of the price changes quoted for specific locations is best viewed as a <u>mean</u> price change in a market where the price changes for <u>individual</u> houses have some non-zero variance around this mean. The importance of this point is discussed in the fourth section of this report.

Many have argued that housing represents a good "inflation hedge". Formally, this requires that movements in house prices be highly correlated with movements in the general level of prices. Only then will the underlying rationale for PLAM's, GPM's and other "deferred interest" mortgages be satisfied. To put this issue in context, we ran simple regressions of the

following form:

$$P_t^i = \alpha_0 + \alpha_1 \pi_t + \varepsilon_t^i \qquad (1)$$

In(3), P_t^i represents the ratio of the price of the i-th house to its price six months earlier. The results of these regressions are presented in Table 2, as are the means and standard deviations of the semi-annual movements in these indexes of house prices. The following observations merit note.

(1) In general, housing prices in the individual locations are <u>not</u> highly correlated with movements in the general level of prices, as evidenced by the low R^2 in these regressions.

(2) Both the means and standard deviations of the price changes in these local markets often differ sharply, suggesting that the notion of a general measure of the "risk" of housing price changes makes little sense.

(3) Attempts (not shown) to see if the reported results are unduly influenced by the often dramatic movements in house prices during the final year in the sample period indicated that they were not. When these observations are dropped for Vancouver, Central Toronto and Mississauga, there is no increase in R^2.

(4) In view of the null results reported in Table 2, we chose not to report the results of our attempts to estimate more detailed models of housing price changes. In general, these attempts also yielded null results.

The results reported in Table 2 are important at the analytical level because they call into question the premise of many "deferred interest" mortgages, which is that housing prices move quite closely with inflation, even over relatively short periods of time. Although the R^2 in these regressions would probably increase if the unit of observation were increased from six months to (say) one year or more, the broad nature of the result is not likely to change. Housing prices and the general price level are not so closely correlated, at least in the short run, to suggest that the nominal appreciation of housing prices is sufficiently certain to guarantee that negative amortization (when the inflation rate is high) is not likely to entail important risks to the lender or the insurer. For the longer run, the differences in the mean rates of appreciation of housing prices merit note. The means of these (six month) rates range from 2.0 percent (Quebec/Montreal, House 2) to 7.9 percent (Vancouver, House 1). These figures compare to a mean (six month) inflation rate of 4.7 percent during this same 8 year period. Real housing prices in Quebec/Montreal thus declined at an average annual rate of 5.6 percent during this 8 year period. Note also the difference in the standard deviations in the different markets, which ranged from 2.6 percent (Fredericton, etc. House 1) to 14.5 percent (Vancouver, House 2). Even if mean rates of appreciation in housing prices were the same across markets, these figures imply that lenders' risks would still vary considerably across markets.

Empirically, we chose to use these results in the simulation exercises as follows. Because of the low correlation over six month intervals of housing prices with the inflation rate, we began by setting this correlation equal to zero in all markets. There are then two inputs into the measure of

risk relevant to lenders and/or insurers. Other things equal, the higher is the mean rate of price appreciation in a particular market, the lower is risk. Other things equal, the higher is the standard deviation of housing price movements, the higher is risk. From the perspective of the insurer of "deferred interest" mortgages, a market in which the mean rate of appreciation is low and the standard deviation is high is quite risky. A market in which the mean rate of appreciation is high and the standard deviation is low is one in which risk is small. These considerations guided our choice of inputs into the simulation experiments which permit relative price movements.

3. Simulated Loan-to-Value (L/V) Ratios When There is No Relative Price Risk

In these exercises, housing prices are constrained to rise at the (stochastic) inflation rate. Since the data in Table 1 suggest that inflation rates were almost always positive, this implies that nominal decreases in housing prices in any given period rarely occurred. In spite of the serial correlation in the inflation process, the likelihood of housing prices declining for a succession of periods is quite low. This result is crucial to an understanding of the simulated L/V ratios, since the denominator in this expression is unlikely to decline from its initial level. The means and standard deviation of the distribution of house prices at the beginning of each period is shown in Table 3. The mean house price is initially set equal to one. At the end of year 5 (the beginning of year 6), the mean house price has increased by a full 65.3 percent, and so forth.

(i) EPM

The EPM is initially amortized over a 20 year period, with renewal (and the resetting of the mortgage rate at the then prevailing market level) occurring every five years. Housing prices, as noted, move in tandem with the inflation rate. The value of the mortgage at the end of each period is inclusive of the mortgage payment due at the end of the period. This is due to our concern with the prospect for default per se, and causes our L/V ratios to modestly exceed those as traditionally constructed.

Results based on the book value of the mortgage are shown in Table 4. The initial loan-to-value ratio is set equal to 0.85. (Results for initial loan-to-value ratios of 0.90 and 0.95 for all mortgage instruments are available from the authors upon request.) The number in each column indicates the probability that the L/V ratio will at least equal the indicated amount. At the end of six months, for example, the probability that the L/V ratio (where the payment due is added to the book value of the mortgage) will at least equal 0.85 is 100 percent. The probability that this ratio will at least equal 0.90 is zero. Thus the L/V ratio always lies between 0.85 and 0.90.

When the market value of the mortgage (i.e. the present value of the fixed nominal payments discounted at the current interest rate) is used in the L/V calculations, their simulated values rise sharply (Table 4A). This is due to the fact that the market value of EPM's rises when interest rates fall, a phenomenon which is reinforced by the secular decline in nominal interest rates that occurs over the simulation horizon. If there were no prepayment options (with or without penalties), these results

indicate that rational individuals would default on their present mortgages, presumably to refinance a new home purchase at a lower interest rate. Because prepayment options do exist, these results clearly overstate the likelihood of default. Note that when interest rates rise, so that the market value of EPM's falls, the L/V ratio is lowered on this account. The intuition behind this result is clear. Rational individual will note the higher cost of financing a new home in the event they choose to default on their present mortgages, which cet. par. reduces the financial incentive to default. In principle, we could build explicit prepayment privileges into our hypothesized mortgage contracts. We could then retain this latter channel, while placing a more realistic limit on the effective increase in the market value of the mortgage. We chose not to pursue this more refined approach at this time.

(ii) GPM

To focus on the likely default risk of GPM's, the initial L/V ratio was also set equal to 0.85. The (semi-annual) rates of graduation were set equal to either two or five percent. The latter imply annual rates of graduation of (approximately) 4 to 10 percent. Simulations are reported (Tables 5, 5A) for both book and market value of the mortgages, and the earlier comments apply. In interpreting these results, it is important to note that the mean (six month) inflation rate in the simulation trials is almost 5 percent. This is equal to the higher (semi-annual) rate of graduation. The case in which the rate of graduation equals the rate of inflation is of special interest since it corresponds to the "pure" PLAM.

(iii) VRM, including dual rate VRM provided by the CIBC

For a VRM, the book and market values of the mortgage are the same. The payment in the current period depends upon the interest rate in the current period. Again, the numerator in the L/V ratio is inclusive of the (semi-annual) payment due at the end of the (six month) period. Results are presented in Table 6 for the case in which the initial L/V ratio is equal to 0.85.

For the CIBC's variable rate mortgage, the interest rate charged in each period is set equal to the prime business loan rate. Payments are fixed in our simulations for a 5-year period, which distinguishes this mortgage from a pure VRM. If the prime rate diverges from its initial value, the CIBC's VRM effectively functions as a dual rate mortgage (Appendix A). If interest rates rise, the additional interest payments that are required are deferred and added to the principal at the end of the 5-year period. If interest rates fall, the opposite occurs. Again, the book and market values of the mortgage are the same. The results (Table 7) do not simply reproduce those for the VRM due to the fact that payments are initially fixed for 5 years, and it is the mortgage payment actually due that is added to the market value of the mortgage in our constructed L/V ratios. Graduation rates (semi-annual) of 2 and 5 percent are simulated in addition to the level payment design, since the CIBC does provide a graduated payment option. In light of the earlier discussion, the results are straightforward and require no elaboration.

(iv) PLAM

With no relative price risk, our simulations for a PLAM produce results similar to those for an EPM in a world of no inflation. Because the real interest rate on the PLAM is initially fixed for a 5-year period, the book and market values of the mortgage diverge, just as in the case of an EPM, GPM or SAM. Because real rates trend downward during the simulation period (Table 1), market values on average exceed book values. The results for both book (Table 8) and market (Table 8A) values are shown, again for an initial L/V ratio of 0.85. Note the absence of "defaults" when the book value of the mortgage is used. This result is not surprising since the "best case" scenario for a PLAM, a world in which movements in housing prices exactly match changes in the rate of inflation, is built into the simulation results.

(v) SAM

In a SAM, the borrower makes payments on the basis of a below-market interest rate for a specified period of time. At the end of the period of reduced payments, the lender receives an agreed upon fraction of any nominal increase in the value of the mortgaged property. Formally, the lender has - in addition to the fixed stream of nominal payments - a call option on the mortgaged home, with a striking price equal to its market value at the date that the mortgage is taken out. In our simulations, the borrower makes payments for the first five years at an annual rate which is 4 percent less than the initial market rate (17 percent). At the end of this period, the book value of the mortgage is set equal to that of an EPM taken out at the same time but at the higher rate. At this time, the lender receives a designated fraction of any nominal capital gain

on the home. This fraction was that amount, in these no relative price simulations, which would on average have made a risk-neutral lender indifferent between a SAM and an EPM at the going market rate. For initial loan-to-value ratios of .85, .90 and .95, the fraction (or "SAM factor") is equal to .310, .329, and .347. Note from Table 3 that the mean house price after 5 years (i.e. after 10 semi-annual periods) had risen 65.3 percent from its initial level, with a standard deviation of 16 percent. This result implies that, for practical purposes, the inflation process was such that the likelihood of a nominal capital loss - and thus the expiry of the call option with zero value - was zero. Note, however, that this result is likely to be overturned when the assumption of no relative price risk is relaxed. Note further that our prior evidence that local house prices are more volatile than the inflation rate implies a higher value for this call option. We nonetheless use these same "SAM factors" in the relative price simulations, and this caveat is in order.

Conceptually, the market value of the SAM at each point in time is inclusive of the value of the option at that time. In our simulations, we define the market value of the mortgage to include (1) the present value of the (known) book value at the end of year 5, (2) the mortgage payment due at the end of the designated period, and (3) the market value of the call option at that point in time. Thus the rational borrower factors the likely value of the lender's partial claim to any nominal capital gain into his assessment of the market value of his mortgage at each point in time. These results, for an initial loan-to-value ratio of .85, are presented in Table 9A. Note that, in the first two periods, the probability

that the L/V ratio will exceed one is not zero. To help place these results in perspective, we also present L/V ratios using a measure of the book value of the SAM. Because we construct the SAM to have the same book value at the end of 5 years as an EPM taken out at market rates, we defined (somewhat arbitrarily) the book value of the SAM at each point in time as the book value of this EPM plus the (reduced) mortgage payment due at that date. These results (Table 9) confirm the obvious. When only the reduced mortgage payments are taken into consideration, the L/V ratios will be less than those for an EPM taken out at market rates (Table 4).

4. Simulated Loan-to-Value (L/V) Ratios When There is Relative Price Risk

As previously noted, the means and standard deviations of the rates of price appreciation vary sharply across the local housing markets (Table 2). For purposes of simulation, we chose to focus on five local markets whose characteristics served to "span" the available range of outcomes. Based on historical price movements, we can classify the five markets as follows:

Vancouver (House 1):	high expected appreciation, high variance
Toronto (House 1):	medium expected appreciation, medium variance
Saskatoon, etc. (House 2):	medium expected appreciation, low variance
Mississauga (House 1):	low expected appreciation, medium variance
Fredericton, etc. (House 2):	low expected appreciation, low variance

Note, for example, that while the low expected rate of appreciation in Fredericton is likely to make all "deferred interest" mortgages quite risky, the low variance is likely to make level-payment mortgages relatively

safe. There is, of course, no reason why future price movements in any of these locations will mirror past price movements in that market. Nonetheless, past price movements are probably a useful measure of the range of possible future outcomes. In view of the likelihood that the C.M.H.C. would set a nation-wide premium for any mortgage instrument it chose to insure, the latter is all that is necessary to justify the exercise.

Clearly, the simulated distribution of housing prices in each of these five markets is the key determinant of the degree of default risk of the alternative mortgage designs. The mean rates of appreciation at different points in time, as well as their standard deviations, are presented in Table 10. Comparable data are also presented for the rate of inflation. As noted previously, the distribution of housing prices in each of the local markets is assumed to be independent of movements in the overall inflation rate. In the earlier simulations in which we ruled out relative price risk, we effectively assumed the other extreme case, that of perfect correlation with the rate of inflation in every local housing market. Empirical evidence favors the independence assumption, and contrasting these results with the previous ones serves to highlight the crucial importance of the correlation issue. In Vancouver, for example, the mean rate of appreciation after 2 years is 33.8 percent, but with a large standard deviation of 36 percent. In Fredericton, the mean rate of appreciation after 2 years is 10 percent, with a standard deviation of only 5 percent. After these same two years, the mean of the simulated changes in the aggregate price level is 22.8 percent, with a standard deviation of 4 percent. Note that these results imply that the real

price of housing has fallen in Fredericton, and risen in Vancouver.

To limit the amount of output to be presented, and to facilitate comparisons across local markets, we present results in Tables 11 to 14 for the case in which the initial loan-to-value ratio is 0.85. For the GPM, VRM and CIBC's dual rate VRM, results are presented for the case in which the (semi-annual) graduation rate is 5 percent. Our purpose is to highlight the role of "deferred interest" mortgages, as discussed in the introduction to this study. Illustrative tables showing the impact of changing (1) the initial loan-to-value ratio and (2) the degree of graduation for a GPM follow the main discussion in the text, which focuses on Tables 11 to 14. Additional supporting tables for all mortgage designs and all local housing markets are available upon request.

(i) EPM

The key message in these results (Table 11) is that the high expected rate of appreciation of house prices is <u>not</u> sufficient to make the default risk of EPM's small <u>if</u> the variability around this rate of appreciation is high. In spite of the mean appreciation rate (semi-annual) of 7.9 percent in Vancouver, the simulated L/V ratios frequently exceed one, even several years after the mortgage is taken out. This is a direct reflection of the period-to-period variability in house prices. By contrast, the L/V ratios <u>never</u> exceed one in Fredericton, in spite of the much lower expected rate of appreciation of 2.5 percent. This is due to the fact that the period-to-period variation in house prices is relatively small. Note that the probability that the L/V ratio in Vancouver will exceed one declines steadily over time, as it does in Toronto and Mississauga. This

result is due to the fact that the expected rate of appreciation in house prices is positive, while the payments due under the EPM are fixed in nominal terms. Note, finally, that the L/V ratio never exceeds one when we constrain the rate of appreciation of house prices to exactly equal the (stochastic) inflation rate (Table 4). This is due to the relatively low variability of the inflation rate (Table 10), which essentially rules out any major decline in house prices.

(ii) GPM

With a positive rate of graduation, the simulated L/V ratios must be higher with a GPM than with an EPM. The important result in Table 12 is the differential incidence of the higher L/V ratios. In Vancouver, the increase - especially in the first year after the GPM is taken out - is not too large. This is due to the fact that it is the high variability of price movements which is causing a large number of "defaults" under the EPM, which occur in spite of the high mean rate of appreciation of house prices. By contrast, the low variability of price movements ensures that no "defaults" occur in Fredericton under the EPM. However, the fact that the mean rate of appreciation of house prices in Fredericton is only 2.8 percent (semi-annual), which is considerably less than the graduation rate (semi-annual) of 5 percent, yields a steady increase in the likelihood of "default" over time. The same type of result occurs in Mississauga, although the contrast between the GPM and EPM results is less sharp since price variability in Mississauga is much larger than in Fredericton. In spite of the fact that the mean rate of appreciation of house prices in Saskatoon is also less than the graduation rate (4.5 percent vs. 5 percent),

no "defaults" occur. This is a reflection of the low variability in house prices, together with the closeness of the mean appreciation rate to the graduation rate.

Finally, the contrast with the case in which house prices grow exactly at the inflation rate (Table 5(2)) merits note. When there are no relative price movements, and when the mean inflation rate is roughly equal to the graduation rate, the simulated L/V ratios never exceed one. The results in Table 12 show how counterfactual this outcome is likely to be.

(iii) VRM, Including Dual Rate VRM Provided by the CIBC

Results for a VRM with a (semi-annual) graduation rate of 5 percent are presented in Table 13. The results are very similar to those for the GPM with the same graduation rate, and the earlier remarks apply. The slight decline in nominal interest rates which occurs over the 5-year period, which on average reduces the amount of the mortgage payments relative to those under the GPM, serves to lower the simulated L/V ratios. The fact that this effect is small, together with the fact that each simulation run begins with a different "seed" number, explain why the L/V ratios are not uniformly lower for the VRM. In fact, the L/V ratios are noticeably higher in Mississauga. As with the GPM, however, the combination of a low mean appreciation rate and moderately high year-to-year variability in prices makes the Mississauga market the riskiest from the viewpoint of the potential insurer. Finally, the results for the CIBC's dual rate mortgage (Table 13A) are quite similar. One need only note that the ability of the borrower to fix his mortgage payments for 5 years does not materially alter the degree of default risk relative

to a standard VRM. The only caveat in this regard is that nominal interest rates did, on average, decline over our simulation period.

(iv) PLAM

Under the PLAM, "defaults" occur in all local markets (Table 14). This result is in sharp contrast to the case in which house prices are constrained to grow at the inflation rate (Table 8), where no "defaults" occur. In the present simulations, there is no correlation between the rate of prices increases in the local markets and the overall rate of inflation. Although extreme, this result is roughly consistent with the actual behavior of house prices over the period 1974-1982. The high incidence of defaults is not surprising, since the "pure" PLAM is premised on a high degree of correlation between house price movements and the general inflation rate. There is, of course, no reason that the real payments stream under a PLAM could not be given a downward tilt (i.e. the real payments could be structured to decline over time). This would, other things equal, reduce the likelihood of default. We chose to simulate only the "pure" PLAM, with its constant real payments stream, but other designs are readily accomodated.

The behavior of the simulated L/V ratios in the separate markets is broadly similar to the results under the GPM. This is due to the fact that the (semi-annual) graduation rate of 5 percent for the GPM is quite similar to the mean inflation rate. The major difference is in Fredericton, where the number of "defaults" rises far more dramatically over time with the PLAM. This is due to the fact that the inflation rate in (roughly) half of the simulations exceeds its mean, thus - in effect -

requiring a larger increase in payments (and loan principle) than that implied by the graduation rate of 5 percent for the GPM. As always, Saskatoon is the least risky market.

(v) SAM

When the initial loan-to-value ratio is 0.85, lenders receive 31 percent of any nominal appreciation in the price of the mortgaged home after the 5 years of below-market mortgage payments. The latter are based on an annual mortgage rate of 13 percent, compared to the market rate of 17 percent. The market value of the mortgage is defined to include (1) the present value of the (known) book value at the end of year 5; (2) the present value of the remaining below-market mortgage payments, inclusive of the mortgage payment due at the end of the designated period; and (3) the market value of the lender's call option at that point in time.

Even with this measure of the value of the mortgage, which exceeds any naive measure which excludes the estimated value of the lender's claim, the simulated L/V ratios are much lower than in any of the other "deferred interest" mortgage designs (Table 15). The reason is simple. Both the numerator (the market value of the mortgage) and the denominator (the market value of the house) move together by virtue of the lender's call option. The result is that the upper tail of the simulated L/V ratios is significantly reduced relative to the previous cases. If the "SAM factors" used in our simulations are at all simular to the ones that lenders would in fact demand, then SAM's will be the least risky mortgage instrument from the viewpoint of the potential insurer. Note also, however, that we abstract from any "moral hazard" problem that would be created by SAM's, although the lender's claim in our simulations (31 percent of

of the nominal price appreciation) is sufficiently small that it is likely to leave intact owners' incentives regarding maintenance and repair.

(vi) Assessing the Impact of Changing Initial Loan-to-Value Ratios and Graduation Rates on the Risk of Default

To provide evidence on this issue, we present detailed results for a GPM with initial loan-to-value ratios of 0.85 to 0.95 and a (semi-annual) graduation rate of 2 percent. We present results for both Vancouver (Table 16) and Fredericton (Table 17), where mean appreciation rates and period-to-period variability in prices differ sharply.

In both markets, of course, "defaults" increase when the initial loan-to-value ratio increases and decrease when the rate of graduation is reduced. The results suggest that is no simple or time-invariant tradeoff between these features such that the risk to the insurer may be held constant at a predetermined level. In Fredericton, for example, the (semi-annual) graduation rate of 5 percent (Table 12) produces a steady rise in "defaults" over time. Raising the initial loan-to-value ratio to 0.95 and reducing the (semi-annual) graduation rate to 2 percent produces more "defaults" initially, but less later on. When this graduation rate is lowered to 2 percent and the initial loan-to-value ratio of 0.85 is retained, however, the likelihood of default declines sharply. This is due to the combination of a low mean appreciation rate, but relatively high year-to-year price stability, in Fredericton. By contrast, lowering the graduation rate to 2 percent in Vancouver while retaining the initial loan-to-value ratio at 0.85 produces no similar effect. (This result is, of course, anticipated in the prior comparison of Tables 11 and 12.) In both markets, but especially in Fredericton, raising the initial loan-to-value

ratio while keeping the graduation rate at 2 percent serves to increase the likelihood of default. In short, as anticipated in the earlier results, the different types of price behavior in the local markets preclude any simple rule which trades off graduation for initial owner equity as a means of keeping default risk constant. In addition, any such tradeoff is not likely to be invariant to the amount of time that has elapsed since the mortgage was taken out.

REFERENCES

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Table 1

Simulated Values of Inflation and Nominal Interest Rates

	INFLATION		NOMINAL INTEREST RATES	
	Mean	S.D.	Mean	S.D.
1	1.0511	0.0	1.0817	0.0
2	1.0546	0.0115	1.0781	0.0083
3	1.0518	0.0113	1.0742	0.0107
4	1.0522	0.0123	1.0726	0.0125
5	1.0519	0.0135	1.0714	0.0125
6	1.0517	0.0140	1.0699	0.0124
7	1.0514	0.0147	1.0697	0.0130
8	1.0510	0.0156	1.0689	0.0148
9	1.0491	0.0165	1.0689	0.0151
10	1.0495	0.0171	1.0684	0.0159
11	1.0484	0.0172	1.0678	0.0168
12	1.0492	0.0170	1.0673	0.0175
13	1.0493	0.0167	1.0671	0.0169
14	1.0494	0.0171	1.0664	0.0173
15	1.0489	0.0182	1.0673	0.0181
16	1.0492	0.0184	1.0669	0.0178
17	1.0488	0.0180	1.0665	0.0178
18	1.0492	0.0191	1.0658	0.0174
19	1.0473	0.0193	1.0643	0.0188
20	1.0484	0.0203	1.0642	0.0186
21	1.0476	0.0193	1.0640	0.0192
22	1.0479	0.0206	1.0642	0.0197
23	1.0484	0.0198	1.0631	0.0194
24	1.0472	0.0193	1.0629	0.0190
25	1.0485	0.0189	1.0645	0.0192
26	1.0477	0.0190	1.0644	0.0193
27	1.0498	0.0178	1.0640	0.0186
28	1.0487	0.0199	1.0643	0.0187
29	1.0507	0.0189	1.0648	0.0179
30	1.0488	0.0199	1.0651	0.0194
31	1.0503	0.0199	1.0649	0.0191
32	1.0493	0.0195	1.0645	0.0194
33	1.0488	0.0197	1.0642	0.0202
34	1.0498	0.0185	1.0651	0.0196
35	1.0497	0.0190	1.0652	0.0193
36	1.0491	0.0180	1.0655	0.0183
37	1.0502	0.0188	1.0648	0.0180
38	1.0500	0.0191	1.0652	0.0193
39	1.0492	0.0185	1.0653	0.0187
40	1.0491	0.0191	1.0639	0.0187

Table 2

Measures of Housing Price Behavior in Alternative Locations

Location	α_0	α_1	σ_ε	R^2	D.W.	Mean	Std. Dev.
Vancouver							
House 1	-3.06	3.95	0.142	.084	1.89	1.079	0.143
	(0.80)	(1.09)					
House 2	-2.99	3.87	0.144	.079	1.43	1.068	0.145
Edmonton/Calgary							
House 1	1.36	-0.280	.059	.002	1.28	1.068	0.057
	(0.87)	(0.18)					
House 2	1.79	-0.692	.058	.017	1.55	1.061	0.056
	(1.15)	(0.47)					
Saskatoon/Regina/Winnipeg							
House 1	0.35	0.664	0.048	.023	1.85	1.044	0.046
	(0.27)	(0.55)					
House 2	0.24	0.762	0.033	.058	1.92	1.045	0.033
	(0.28)	(0.90)					
Central Toronto							
House 1	-2.35	3.244	0.078	.170	2.46	1.045	0.083
	(1.13)	(1.63)					
House 2	-2.12	3.019	0.087	.126	2.10	1.043	0.087
	(0.92)	(1.37)					
Mississauga							
House 1	-3.11	3.958	0.057	.363	2.46	1.029	0.069
	(2.04)	(2.72)					
House 2	-2.17	3.055	0.052	.294	2.14	1.024	0.059
	(1.58)	(2.32)					
Quebec City/Montreal							
House 1	-0.67	1.629	0.051	.109	1.23	1.031	0.052
	(0.50)	(1.26)					
House 2	-1.84	2.734	0.063	.182	1.09	1.020	0.067
	(1.09)	(1.70)					
Fredericton/Charlottetown/St. John's/Saint John							
House 1	0.33	0.669	0.026	.071	2.03	1.028	0.026
	(0.46)	(1.00)					
House 2	-0.39	1.358	0.025	.262	1.84	1.025	0.028
	(0.60)	(2.15)					

Note: The mean (six month) inflation rate for this period as measured by the consumer price index was 4.7 percent.

Table 3

Distribution of House Prices, No Relative Price Risk

Period (6-month)	Mean	S.D.
1	1.0000	0.0
2	1.0546	0.0115
3	1.1092	0.0191
4	1.1673	0.0296
5	1.2281	0.0417
6	1.2910	0.0542
7	1.3588	0.0693
8	1.4287	0.0870
9	1.4999	0.1075
10	1.5753	0.1307
11	1.6531	0.1564
12	1.7363	0.1844
13	1.8238	0.2133
14	1.9164	0.2470
15	2.0131	0.2835
16	2.1154	0.3220
17	2.2233	0.3638
18	2.3350	0.4115
19	2.4515	0.4632
20	2.5743	0.5225
21	2.7055	0.5841
22	2.8428	0.6545
23	2.9893	0.7376
24	3.1374	0.8041
25	3.2961	0.8851
26	3.4644	0.9685
27	3.6467	1.0611
28	3.8366	1.1565
29	4.0415	1.2602
30	4.2517	1.3825
31	4.4805	1.5117
32	4.7169	1.6402
33	4.9624	1.7701
34	5.2247	1.9159
35	5.5013	2.0700
36	5.7888	2.2286
37	6.0904	2.4060
38	6.4225	2.5883
39	6.7576	2.7695
40	7.1117	2.9680
41	7.4816	3.1747

GRAD.PAYMENT 20 YEAR MORTGAGE,PRIME BUS.INT. DATA

TABLE # 4

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500					
MATURITY-6 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	42500.00					
GRADUATION OF PAYMENTS	0.0					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		
NO RELATIVE PRICE RISK	0					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	99.00	4.50	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	94.50	19.50	0.0	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	94.00	94.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	47.00	7.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	16.00	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	6.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	1.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 20 YEAR MORTGAGE.PRIME BUS.INT. DATA

TABLE # 4A

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500					
MATURITY-4 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	42500.00					
GRADUATION OF PAYMENTS	0.0					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		
NO RELATIVE PRICE RISK	0					
MARKET VALUES USED TO VALUE MORTGAGE	1					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	98.00	76.00	39.00	9.00	1.00	0.0	0.0
0.50 - 0.99	100.00	99.00	88.00	58.00	26.50	6.50	1.50	0.0	0.0
1.00 - 1.49	99.00	87.50	59.00	30.00	11.50	1.00	0.0	0.0	0.0
1.50 - 1.99	93.00	64.50	35.50	14.00	2.50	1.00	0.0	0.0	0.0
2.00 - 2.49	72.50	39.50	15.50	3.00	0.50	0.0	0.0	0.0	0.0
2.50 - 2.99	45.50	16.00	5.50	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	24.50	5.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	7.50	1.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	1.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 20 YEAR MORTGAGE.PRIME BUS.INT. DATA

TABLE # 5(1)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500					
MATURITY-6 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	42500.00					
GRADUATION OF PAYMENTS	0.0200					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1146	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2664	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		
NO RELATIVE PRICE RISK	0					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	100.00	32.00	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	100.00	72.50	2.50	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	100.00	99.00	20.50	0.50	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	96.00	53.00	9.50	0.50	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	73.00	28.00	3.50	0.50	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	51.50	14.50	1.50	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	30.50	7.50	1.00	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	18.00	4.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	12.50	3.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	4.00	0.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	1.00	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 30 YEAR MORTGAGE.PRIME BUS.INT. DATA

TABLE # 5(2)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500					
MATURITY-6 MONTHS INTERVALS	60					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	42500.00					
GRADUATION OF PAYMENTS	0.0500					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1144	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.00-3	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		
NO RELATIVE PRICE RISK	0					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	100.00	78.50	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	100.00	100.00	43.00	1.00	0.0	0.0	0.0	0.0
1.50 - 1.99	100.00	100.00	93.00	28.00	1.00	0.0	0.0	0.0	0.0
2.00 - 2.49	100.00	99.00	73.00	17.00	1.00	0.0	0.0	0.0	0.0
2.50 - 2.99	100.00	93.50	51.50	12.50	2.50	0.0	0.0	0.0	0.0
3.00 - 3.49	98.00	82.00	43.50	13.00	1.50	0.0	0.0	0.0	0.0
3.50 - 3.99	94.50	66.50	33.50	10.00	3.00	0.0	0.0	0.0	0.0
4.00 - 4.49	85.50	55.50	28.50	8.00	2.00	0.0	0.0	0.0	0.0
4.50 - 4.99	72.50	47.00	24.00	7.50	2.50	0.0	0.0	0.0	0.0
5.00 - 5.99	54.50	31.25	11.50	4.00	0.75	0.0	0.0	0.0	0.0
6.00 - 6.99	36.50	16.75	7.75	2.00	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	23.50	11.75	4.00	0.25	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	14.50	7.50	2.00	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	9.75	3.25	1.25	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.85	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 20 YEAR MORTGAGE.PRIME BUS.INT. DATA

TABLE # 5A(1)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	40				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0200				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0817				
COEFFICIENTS FOR THE INFLATION PROESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000	
NO RELATIVE PRICE RISK	0				
MARKET VALUES USED TO VALUE MORTGAGE	1				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	99.00	78.00	38.00	11.00	2.50	0.0	0.0
0.50 - 0.99	100.00	99.00	87.50	62.00	29.50	9.00	0.0	0.0	0.0
1.00 - 1.49	99.00	93.50	73.00	44.50	18.50	5.00	1.00	0.0	0.0
1.50 - 1.99	97.00	84.50	56.00	26.50	11.00	2.50	0.0	0.0	0.0
2.00 - 2.49	90.50	69.50	38.50	16.50	2.50	0.50	0.0	0.0	0.0
2.50 - 2.99	76.50	49.00	20.50	6.50	1.50	0.50	0.0	0.0	0.0
3.00 - 3.49	60.00	30.00	10.50	3.50	0.50	0.0	0.0	0.0	0.0
3.50 - 3.99	40.00	12.50	4.00	1.00	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	20.00	6.50	2.00	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	7.50	2.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	3.75	0.50	0.25	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	3.25	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 20 YEAR MORTGAGE.PRIME BUS.INT. DATA

TABLE # 5A(2)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	40				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0500				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0817				
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000	
NO RELATIVE PRICE RISK	0				
MARKET VALUES USED TO VALUE MORTGAGE	1				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	97.00	79.00	47.50	19.50	5.50	0.0	0.0
0.50 - 0.99	100.00	98.50	93.50	72.50	40.00	18.50	8.50	1.50	0.0
1.00 - 1.49	100.00	97.50	88.00	70.50	45.50	18.00	7.00	1.50	0.0
1.50 - 1.99	99.50	94.50	82.00	61.50	38.00	20.50	6.00	0.50	0.0
2.00 - 2.49	98.00	90.50	73.00	54.00	29.50	13.50	6.00	1.00	0.0
2.50 - 2.99	99.50	89.50	71.00	49.50	25.00	9.00	3.50	1.00	0.0
3.00 - 3.49	95.00	84.00	65.50	41.50	18.50	7.50	1.50	0.50	0.0
3.50 - 3.99	89.00	75.00	53.00	29.00	9.50	3.00	0.50	0.0	0.0
4.00 - 4.49	83.50	66.50	43.50	17.00	5.00	1.50	0.0	0.0	0.0
4.50 - 4.99	77.00	55.00	27.50	9.50	3.00	0.50	0.0	0.0	0.0
5.00 - 5.99	69.75	39.25	18.75	7.50	2.25	0.25	0.0	0.0	0.0
6.00 - 6.99	43.75	24.00	12.50	6.25	2.50	0.75	0.25	0.0	0.0
7.00 - 7.99	29.00	17.25	7.75	1.75	0.50	0.25	0.0	0.0	0.0
8.00 - 8.99	18.25	8.50	2.25	0.25	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	9.25	2.50	0.25	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	1.15	0.55	0.15	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

VARIABLE RATE MORT. 30 YEAR PRIME RUS. INT. DATA

TABLE # 6

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	4				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0				
INITIAL INFLATION RATE	1.511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0817				
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	0.0	1.0000	0.0	0.0005	
NO RELATIVE PRICE RISK	0				
MARKET VALUES USED TO VALUE MORTGAGE	1				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	0.50	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	95.50	2.00	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	91.50	13.00	0.0	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	93.00	25.00	0.50	0.0	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	36.00	3.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	1.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.50 - 5.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.50 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.50 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.50 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.50 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

COMMERCE 20 YEAR VARIABLE RATE MORTGAGE.PAYMENTS FIXED FOR 5 YEARS. TABLE # 7(1)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500
MATURITY-4 MONTHS INTERVALS	40
INITIAL HOUSE PRICE	50000.00
INITIAL MORTGAGE VALUE	42500.00
GRADUATION OF PAYMENTS	0.0
INITIAL INFLATION RATE	1.0511
INITIAL INTEREST RATE	1.0817
INITIAL INTEREST RATE FOR PAYMENTS	0.0817

COEFFICIENTS FOR THE INFLATION PROCESS	0.1144	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		

NO RELATIVE PRICE RISK 0

MARKET VALUES USED TO VALUE MORTGAGE 1

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	99.50	0.0	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	91.50	3.00	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	82.00	8.50	0.0	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	79.00	14.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	21.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

COMMERCE 20 YEAR VARIABLE RATE MORTGAGE,PAYMENTS FIXED FOR 5 YEARS. TABLE # 7(2)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500
MATURITY-6 MONTHS INTERVALS	40
INITIAL HOUSE PRICE	50000.00
INITIAL MORTGAGE VALUE	42500.00
GRADUATION OF PAYMENTS	0.0200
INITIAL INFLATION RATE	1.0511
INITIAL INTEREST RATE	1.0817
INITIAL INTEREST RATE FOR PAYMENTS	0.0817

COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		

NO RELATIVE PRICE RISK 0

MARKET VALUES USED TO VALUE MORTGAGE 1

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	0.50	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	100.00	26.50	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	99.50	53.50	2.00	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	99.50	66.00	10.50	0.0	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	81.00	26.50	1.50	0.0	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	40.00	8.00	0.50	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	16.00	1.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	3.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	1.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

COMMERCE 20 YEAR VARIABLE RATE MORTGAGE,PAYMENTS FIXED FOR 5 YEARS. TABLE # 7(3)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500					
MATURITY-6 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	42500.00					
GRADUATION OF PAYMENTS	0.0500					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROESS	0.1156	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		
NO RELATIVE PRICE RISK	0					
MARKET VALUES USED TO VALUE MORTGAGE	1					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	3.00	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	100.00	82.50	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	100.00	98.50	40.00	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	100.00	100.00	78.00	18.50	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	100.00	92.50	49.50	8.50	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	96.50	77.00	24.00	4.00	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	88.50	47.50	15.00	2.00	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	71.50	26.00	6.00	1.00	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	47.00	18.00	4.00	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	27.50	8.50	1.00	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	20.25	5.25	0.75	0.50	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	7.25	1.75	0.50	0.50	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	3.00	0.50	0.50	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	1.25	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PRICE LEVEL ADJUSTED MORTGAGE. 20 YEARS.ROLLED OVER EVERY 5 YEARS.

TABLE #

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500					
MATURITY-6 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	42500.00					
GRADUATION OF PAYMENTS	0.0					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROESS	0.1166	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0000	0.0	0.0	0.2000		
NO RELATIVE PRICE RISK	0					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	100.00	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.49	90.75	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.50 - 5.99	22.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PRICE LEVEL ADJUSTED MORTGAGE. 20 YEARS.ROLLED OVER EVERY 5 YEARS. TABLE # 8A

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500
MATURITY=4 MONTHS INTERVALS	40
INITIAL HOUSE PRICE	50000.00
INITIAL MORTGAGE VALUE	42500.00
GRADUATION OF PAYMENTS	0.0
INITIAL INFLATION RATE	1.0511
INITIAL INTEREST RATE	1.0817
INITIAL INTEREST RATE FOR PAYMENTS	0.0817

COEFFICIENTS FOR THE INFLATION PROCESS 0.1166 0.2893 0.5995 0.0104

COEFFICIENTS FOR THE INTEREST RATE PROCESS 0.0063 0.7314 0.0 0.2666 0.0 0.0079

COEFFICIENTS FOR THE RELATIVE PRICE 1.0000 0.0 0.0 0.2000

NO RELATIVE PRICE RISK 0

MARKET VALUES USED TO VALUE MORTGAGE 1

YEAR	PROBABILITIES 0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	94.50	77.00	53.00	28.50	8.00	1.50	0.0
0.50 - 0.99	100.00	100.00	93.50	74.50	49.00	24.50	9.50	3.00	1.00
1.00 - 1.49	100.00	98.50	94.50	77.50	55.00	24.50	7.00	2.50	0.0
1.50 - 1.99	100.00	100.00	94.50	70.00	38.50	15.50	2.50	0.50	0.0
2.00 - 2.49	100.00	100.00	92.00	60.50	30.50	4.50	1.00	0.0	0.0
2.50 - 2.99	100.00	99.50	91.00	42.00	8.00	1.00	0.0	0.0	0.0
3.00 - 3.49	100.00	100.00	77.00	21.00	2.00	0.0	0.0	0.0	0.0
3.50 - 3.99	100.00	99.50	53.00	1.50	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	100.00	100.00	8.50	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	100.00	100.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	67.00	33.75	14.00	3.25	1.00	0.25	0.0	0.0	0.0
6.00 - 6.99	40.00	17.00	7.25	1.75	0.50	0.0	0.0	0.0	0.0
7.00 - 7.99	21.00	7.75	1.25	0.25	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	5.00	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SAM 20 YEAR. REDUCED PAYMENTS FOR THE FIRST 5 YEARS.

TABLE # 9

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	40				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0631				
COEFFICIENTS FOR THE INFLATION PROESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0294	0.0	0.0	0.0690	
NO RELATIVE PRICE RISK	0				
BOOK VALUES USED TO VALUE MORTGAGE	0				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	88.00	0.0	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	88.00	1.00	0.0	0.0	0.0	0.0	0.0
1.00 - 1.49	100.00	87.50	9.00	0.0	0.0	0.0	0.0	0.0	0.0
1.50 - 1.99	88.50	24.00	0.50	0.0	0.0	0.0	0.0	0.0	0.0
2.00 - 2.49	38.00	3.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.50 - 2.99	11.00	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.00 - 3.49	2.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SAM 20 YEAR. REDUCED PAYMENTS FOR THE FIRST 5 YEARS.

TABLE # 9A

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	40				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0631				
COEFFICIENTS FOR THE INFLATION PROESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0294	0.0	0.0	0.0690	
NO RELATIVE PRICE RISK	0				
MARKET VALUES USED TO VALUE MORTGAGE	1				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	97.00	81.00	40.50	14.00	3.50	0.50	0.0
0.50 - 0.99	100.00	100.00	93.00	67.00	28.00	9.00	1.00	0.50	0.50
1.00 - 1.49	100.00	97.50	80.00	45.00	16.50	5.00	1.50	0.0	0.0
1.50 - 1.99	99.00	89.00	61.50	30.00	9.00	2.00	0.0	0.0	0.0
2.00 - 2.49	95.50	73.50	38.00	14.50	3.00	0.50	0.0	0.0	0.0
2.50 - 2.99	84.00	49.50	22.50	8.00	0.50	0.0	0.0	0.0	0.0
3.00 - 3.49	65.00	31.50	12.00	1.00	0.0	0.0	0.0	0.0	0.0
3.50 - 3.99	45.00	15.50	1.00	0.0	0.0	0.0	0.0	0.0	0.0
4.00 - 4.49	23.50	4.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.50 - 4.99	7.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.00 - 5.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.00 - 6.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.00 - 7.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.00 - 8.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.00 - 9.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 10

Simulated Means and Standard Errors of Prices in Local Housing Markets

Market	Assumed Mean (Std. Dev.) (%)	Cumulative Mean (Std. Dev.) Price Appreciation (%) No. of (Six Month) Intervals After Mortgage Taken Out					
		2	4	8	12	16	20
Vancouver House 1	7.9 (14)	15.7 (23)	33.8 (36)	81.8 (67)	157 (127)	232 (180)	346 (257)
Toronto House 1	4.5 (8)	10.2 (12)	20.3 (18)	47.5 (32)	73.2 (43)	106 (62)	150 (90)
Saskatoon, etc. House 2	4.5 (3)	8.6 (5)	17.7 (8)	40.5 (14)	66.7 (20)	97.8 (27)	136 (35)
Mississauga House 1	2.9 (7)	5.6 (10)	11.5 (15)	25.5 (23)	43.4 (35)	58.0 (41)	76.9 (50)
Fredericton, etc. House 1	2.5 (3)	4.6 (4)	10.0 (5)	20.0 (8)	32.2 (12)	45.7 (14)	61.3 (18)
Inflation Rate (CPI)		10.9 (2)	22.8 (4)	50.0 (11)	82.4 (21)	122 (36)	171 (58)

Table 11

Simulated Loan-To-Value Ratios in Local Markets for EPM and Initial Loan-To-Value Ratio of 0.85

LOCAL MARKET	NO. OF YEARS AFTER MORTGAGE TAKEN OUT	PROBABILITY (%) THAT LOAN-TO-VALUE RATIO IS AT LEAST					
		0.85	0.90	0.95	1.0	1.05	1.10
Vancouver 1	1	33.0	23.5	17.0	13.5	9.0	5.5
	2	20.5	14.5	11.0	8.5	6.5	5.5
	3	14.5	12.0	8.0	6.0	5.5	5.0
	4	10.0	7.0	5.5	5.0	5.0	4.5
	5	8.0	7.5	4.5	3.5	3.0	2.0
Toronto 1	1	43.5	26.0	13.5	7.0	2.5	0.5
	2	24.5	15.0	9.0	4.5	1.0	0.0
	3	18.5	9.0	5.5	1.5	0.5	0.0
	4	10.5	5.5	1.5	0.5	0.0	0.0
	5	6.0	3.0	2.5	1.0	0.5	0.5
Saskatoon 2	1	49.5	5.0	0.5	0.0	0.0	0.0
	2	4.5	0.0	0.0	0.0	0.0	0.0
	3	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.0
	5	0.0	0.0	0.0	0.0	0.0	0.0
Mississauga 1	1	59.5	31.5	17.0	7.0	2.5	0.5
	2	37.5	21.5	11.0	6.0	2.0	1.0
	3	25.0	16.0	7.0	3.5	3.0	2.0
	4	20.0	11.0	5.0	3.5	3.0	1.5
	5	11.0	5.0	3.5	1.5	0.5	0.5
Fredericton 1	1	77.0	16.5	0.0	0.0	0.0	0.0
	2	31.0	2.5	0.5	0.0	0.0	0.0
	3	8.0	0.5	0.0	0.0	0.0	0.0
	4	1.0	0.0	0.0	0.0	0.0	0.0
	5	0.0	0.0	0.0	0.0	0.0	0.0

Notes: (1) All results are based on the book values of the mortgage.

Table 12

Simulated Loan-To-Value Ratios in Local Markets for GPM with (Semi-Annual) Graduation Rate of 5 Percent and Initial Loan-To-Value Ratio of 0.85

LOCAL MARKET	NO. OF YEARS AFTER MORTGAGE TAKEN OUT	PROBABILITY (%) THAT LOAN-TO-VALUE RATIO IS AT LEAST					
		0.85	0.90	0.95	1.00	1.05	1.10
Vancouver 1	1	47.0	38.0	28.0	20.0	12.0	6.5
	2	36.0	30.0	27.0	19.0	13.0	8.5
	3	33.5	26.5	22.5	16.5	12.5	10.0
	4	29.5	25.0	20.0	16.5	15.5	12.5
	5	24.0	20.0	16.5	14.5	11.5	9.0
Toronto 1	1	58.0	37.0	20.5	9.5	4.0	0.5
	2	54.0	34.0	33.5	14.0	9.5	5.0
	3	43.0	30.0	20.5	15.0	8.5	5.5
	4	43.0	32.5	20.5	13.0	10.5	7.5
	5	36.5	29.5	21.0	14.5	11.5	8.0
Saskatoon 2	1	72.5	24.5	4.0	0.0	0.0	0.0
	2	57.0	21.5	5.5	0.0	0.0	0.0
	3	44.5	18.5	5.5	0.5	0.0	0.0
	4	37.0	18.5	4.0	0.0	0.0	0.0
	5	31.5	15.5	3.5	0.5	0.0	0.0
Mississauga 1	1	66.5	45.0	21.5	9.5	2.5	0.5
	2	64.0	52.0	37.0	24.0	13.0	9.0
	3	66.5	53.0	44.5	32.0	21.0	13.0
	4	71.5	59.0	48.0	33.0	26.5	19.0
	5	70.5	61.5	48.5	39.0	31.5	19.5
Fredericton 1	1	97.5	55.0	8.5	0.0	0.0	0.0
	2	95.0	76.0	31.5	7.0	0.5	0.0
	3	97.5	81.5	43.0	18.0	4.5	0.5
	4	97.5	81.5	54.0	28.5	9.5	2.0
	5	97.0	85.0	60.0	34.0	15.5	4.5

Notes: (1) All results are based on book values of the mortgage.

Table 13

Simulated Loan-To-Value Ratios in Local Markets for VRM with (Semi-Annual) Graduation Rate of 5 Percent and Initial Loan-To-Value Ratio of 0.85

LOCAL MARKET	NO. OF YEARS AFTER MORTGAGE TAKEN OUT	PROBABILITY (%) THAT LOAN-TO-VALUE RATIO IS AT LEAST					
		0.85	0.90	0.95	1.0	1.05	1.10
Vancouver 1	1	36.0	23.5	15.5	12.5	7.0	3.0
	2	34.0	28.0	18.0	13.5	10.0	8.5
	3	25.5	21.5	15.5	13.0	10.0	7.0
	4	22.5	18.0	15.0	9.5	8.0	7.0
	5	17.0	16.0	12.5	11.0	8.0	7.0
Toronto 1	1	59.5	40.0	23.5	14.0	6.0	1.5
	2	55.5	40.0	28.0	16.0	8.0	4.5
	3	50.5	36.5	25.5	18.5	12.0	6.5
	4	41.5	31.0	23.5	17.0	14.5	9.5
	5	44.0	29.5	22.5	16.5	13.5	9.5
Saskatoon 2	1	72.5	26.0	4.5	0.5	0.0	0.0
	2	52.0	21.5	5.5	1.0	0.0	0.0
	3	34.0	15.0	3.5	1.0	0.0	0.0
	4	23.5	9.5	3.0	0.5	0.0	0.0
	5	14.5	6.0	2.0	0.5	0.0	0.0
Mississauga 1	1	85.5	69.5	49.0	28.5	16.0	8.0
	2	82.5	67.5	49.5	39.5	26.5	17.5
	3	78.0	68.0	56.5	46.5	31.5	23.0
	4	75.5	67.5	59.0	45.0	33.0	26.5
	5	68.5	61.5	53.0	45.5	37.5	31.5
Fredericton 1	1	97.0	50.0	6.0	0.0	0.0	0.0
	2	93.5	59.5	22.0	2.0	0.0	0.0
	3	91.5	66.5	32.5	11.0	1.5	0.0
	4	88.5	70.0	39.5	15.5	5.0	1.5
	5	88.5	70.0	41.0	20.0	9.0	2.5

Notes: (1) Book and market values of the mortgage are the same for a VRM.

Table 13A

Simulated Loan-To-Value Ratios in Local Markets for CIBC's VRM with (Semi-Annual) Graduation Rate of 5 Percent and Initial Loan-To-Value Ratio of 0.85

LOCAL MARKET	NO. OF YEARS AFTER MORTGAGE TAKEN OUT	PROBABILITY (%) THAT LOAN-TO-VALUE RATIO IS AT LEAST					
		0.85	0.90	0.95	1.0	1.05	1.10
Vancouver 1	1	38.0	25.0	16.0	13.0	7.5	3.5
	2	33.5	26.0	18.0	12.5	10.0	8.0
	3	24.0	16.5	14.5	11.5	9.0	6.5
	4	18.0	15.0	10.0	8.0	6.5	5.0
	5	12.0	11.0	9.5	9.0	6.5	5.5
Toronto 1	1	61.0	43.5	26.0	15.0	7.0	2.5
	2	54.0	37.5	27.5	16.0	8.5	4.5
	3	47.0	34.5	22.5	16.5	12.0	6.5
	4	35.0	24.5	18.5	15.5	11.5	8.5
	5	32.0	23.0	17.0	11.5	9.5	7.0
Saskatoon 2	1	78.5	33.0	7.0	0.5	0.0	0.0
	2	48.0	22.0	6.5	1.0	0.0	0.0
	3	30.0	12.0	3.5	2.5	0.5	0.0
	4	17.0	8.0	2.5	0.5	0.5	0.0
	5	12.0	4.0	2.0	1.0	0.0	0.0
Mississauga 1	1	77.5	56.5	35.5	18.0	5.0	2.0
	2	66.0	45.0	35.5	24.0	13.5	6.0
	3	58.0	45.5	36.0	23.5	14.0	9.5
	4	53.0	43.5	32.5	25.0	20.0	14.5
	5	43.5	37.5	28.5	21.5	16.0	11.5
Fredericton 1	1	96.0	65.0	17.5	2.5	0.0	0.0
	2	89.0	57.0	26.5	9.0	1.0	0.0
	3	76.5	49.0	29.5	15.0	5.0	1.5
	4	67.5	43.0	28.0	17.5	8.5	3.0
	5	49.0	34.5	23.5	13.0	7.0	4.0

Notes: (1) Book and market values of the mortgage are the same for a VRM.

Table 14

Simulated Loan-To-Value Ratios in Local Markets for PLAM
and Initial Loan-To-Value Ratio of 0.85

LOCAL MARKET	NO. OF YEARS AFTER MORTGAGE TAKEN OUT	PROBABILITY (%) THAT LOAN-TO-VALUE RATIO IS AT LEAST					
		0.85	0.90	0.95	1.0	1.05	1.10
Vancouver 1	1	42.5	29.0	20.5	16.0	12.0	6.5
	2	37.0	27.5	20.0	15.5	13.0	8.5
	3	29.5	22.5	18.5	16.0	12.0	9.5
	4	25.5	23.0	19.0	15.0	11.5	9.5
	5	21.5	15.5	15.5	11.0	7.5	7.0
Toronto 1	1	53.5	33.0	16.5	7.5	3.0	0.5
	2	52.5	39.5	27.0	18.5	9.5	6.0
	3	48.0	38.5	26.0	17.5	13.0	9.5
	4	48.0	37.0	30.0	21.0	14.5	10.0
	5	43.5	33.5	27.5	21.0	16.5	13.5
Saskatoon 2	1	74.0	30.0	3.5	1.0	0.0	0.0
	2	61.5	30.5	12.0	2.0	0.5	0.5
	3	52.0	25.5	14.0	7.0	1.5	0.0
	4	44.5	28.0	17.0	7.0	3.0	1.5
	5	37.0	24.5	15.0	9.0	5.0	2.5
Mississauga 1	1	70.0	47.0	29.5	16.5	9.0	3.0
	2	68.0	53.5	41.5	26.5	19.0	13.0
	3	69.5	57.0	44.0	33.5	25.0	18.5
	4	72.5	57.5	46.5	36.0	29.0	21.0
	5	68.5	59.5	51.0	40.5	33.0	26.0
Fredericton 1	1	98.0	61.0	12.5	2.0	0.5	0.0
	2	93.0	76.0	41.5	14.0	3.5	0.5
	3	90.0	78.0	54.5	29.0	11.5	5.5
	4	89.5	77.0	61.0	38.5	21.5	11.0
	5	87.0	78.5	62.0	45.5	30.0	18.5

Notes: (1) All results are based on book values of the mortgage.

Table 15

Simulated Loan-To-Value Ratios for SAM with Initial Loan-To-Value Ratio of 0.85

LOCAL MARKET	NO. OF YEARS AFTER MORTGAGE TAKEN OUT	PROBABILITY (%) THAT LOAN-TO-VALUE RATIO IS AT LEAST					
		0.85	0.90	0.95	1.0	1.05	1.10
Vancouver 1	1	48.0	31.0	22.0	17.0	9.0	5.0
	2	30.5	21.5	15.5	10.5	6.5	4.5
	3	19.5	13.5	10.0	7.0	6.5	5.5
	4	12.0	7.5	6.0	5.0	5.0	4.5
	5	8.0	7.0	3.5	3.0	2.5	2.0
Toronto 1	1	73.0	47.0	27.0	12.5	3.5	1.0
	2	47.0	31.5	15.5	8.5	5.0	2.5
	3	27.5	16.5	8.0	4.0	3.0	1.0
	4	16.5	8.0	5.0	3.5	2.0	1.5
	5	5.5	4.0	4.0	3.5	3.0	3.0
Saskatoon 2	1	70.0	37.5	15.0	4.0	0.0	0.0
	2	38.5	16.0	4.5	0.5	0.5	0.0
	3	9.5	1.5	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.0
	5	0.0	0.0	0.0	0.0	0.0	0.0
Mississauga 1	1	75.0	50.5	24.5	9.5	5.0	1.5
	2	62.5	35.5	21.5	12.5	4.0	1.0
	3	42.0	22.5	13.0	7.5	1.5	1.0
	4	28.5	15.5	6.0	4.0	1.5	0.0
	5	18.0	8.5	4.0	2.5	1.0	0.5
Fredericton 1	1	85.0	53.5	27.5	8.0	2.5	0.0
	2	73.5	38.5	18.0	4.5	0.5	0.0
	3	40.5	14.5	3.0	0.5	0.0	0.0
	4	12.0	1.0	0.0	0.0	0.0	0.0
	5	1.0	0.0	0.0	0.0	0.0	0.0

Notes: (1) All results are for the market value of the mortgage.

(2) For an initial loan-to-value ratio of 0.85, the "SAM factor" is 0.310; that is, the lender receives 31.0 percent of any nominal capital gain.

GRAD.PAYMENT 20 YEAR MORTGAGE.PRIME MIS.INT. DATA.VANCOUVER HOUSE 1

TABLE # 16(1)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.0500					
MATURITY=4 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	47500.00					
GRADUATION OF PAYMENTS	0.0200					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0791	0.0	0.0	0.1428		
RELATIVE PRICE RISK	1					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES 0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	99.50	98.50	92.50	84.00	68.00	53.00	35.00	26.00	15.50
0.50 - 0.99	89.50	78.00	71.00	56.50	42.00	35.00	29.50	20.50	15.50
1.00 - 1.49	74.00	64.00	52.00	44.00	36.00	28.50	24.00	19.50	14.50
1.50 - 1.99	66.50	56.00	48.00	37.00	30.50	24.50	23.00	19.50	16.00
2.00 - 2.49	52.00	45.50	41.00	34.00	29.00	24.00	18.00	15.50	12.50
2.50 - 2.99	51.50	43.00	37.00	29.50	25.50	20.00	17.50	13.00	9.50
3.00 - 3.49	47.00	39.00	33.00	24.50	24.50	15.50	11.50	9.50	8.50
3.50 - 3.99	40.50	33.50	26.50	24.50	20.00	15.50	12.00	9.50	7.00
4.00 - 4.49	36.50	27.50	23.00	20.00	14.00	12.00	9.00	7.00	6.00
4.50 - 4.99	30.50	24.00	20.00	15.00	12.50	10.00	9.00	8.00	6.50
5.00 - 5.49	23.50	19.50	16.50	14.00	12.25	9.25	7.50	6.50	5.50
5.50 - 5.99	19.00	17.00	16.25	12.00	9.00	6.75	5.75	4.50	4.50
6.00 - 6.99	14.75	11.75	9.00	7.25	5.50	4.75	3.75	2.50	1.75
7.00 - 7.99	11.25	9.00	7.25	6.50	5.25	4.00	3.50	2.75	2.50
8.00 - 8.99	8.25	6.50	5.75	5.25	4.00	3.00	2.25	1.75	1.50
9.00 - 9.99	6.00	4.70	4.95	1.60	1.40	1.10	0.70	0.55	0.40
10.00 - 14.99	3.00	2.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0							

GRAD.PAYMENT 20 YEAR MORTGAGE,PRIME MIS.INT. DATA,VANCOUVER HOUSE 1 TABLE # 16(2)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1000					
MATURITY-6 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	45000.00					
GRADUATION OF PAYMENTS	0.0200					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0817					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0003	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0791	0.0	0.0	0.1428		
RELATIVE PRICE RISK	1					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	99.00	95.00	83.50	66.50	49.50	36.00	20.00	13.00	8.50
0.50 - 0.99	89.00	82.00	67.50	55.50	40.00	30.00	22.50	16.00	11.50
1.00 - 1.49	78.00	68.00	57.50	44.50	34.00	27.50	20.50	16.50	13.00
1.50 - 1.99	66.00	59.00	50.00	43.00	30.00	27.00	21.50	18.00	13.50
2.00 - 2.49	61.00	49.50	43.50	34.50	29.00	25.00	19.50	16.50	12.50
2.50 - 2.99	48.50	41.00	36.50	24.00	24.00	18.50	14.00	12.00	10.50
3.00 - 3.49	41.50	35.50	27.50	23.50	20.00	18.00	13.00	12.00	10.50
3.50 - 3.99	38.00	32.50	27.00	20.00	18.00	15.00	12.50	10.50	10.00
4.00 - 4.49	34.00	29.00	25.50	20.50	18.50	16.00	13.50	10.00	8.00
4.50 - 4.99	32.50	27.50	23.50	18.00	14.50	13.00	12.00	9.50	6.00
5.00 - 5.99	27.25	22.50	19.50	16.75	15.00	11.50	7.50	6.00	4.00
6.00 - 6.99	20.50	16.50	13.50	10.75	8.25	6.75	5.25	4.00	2.25
7.00 - 7.99	16.00	13.75	10.50	7.75	6.00	4.25	4.00	3.25	2.25
8.00 - 8.99	12.00	9.50	8.50	6.75	4.75	3.50	3.25	2.75	2.75
9.00 - 9.99	8.50	7.00	6.00	5.75	4.50	4.25	3.25	2.75	2.00
10.00 - 14.99	4.20	3.35	2.95	2.50	2.25	1.95	1.85	1.65	1.25
15.00 - 19.99	0.40	0.35	0.35	0.30	0.10	0.05	0.00	0.00	0.00

GRAD.PAYMENT 20 YEAR MORTGAGE.PRIME BUS.INT. DATA.VANCOUVER HOUSE 1 TABLE # 16(3)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	40				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0200				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0817				
COEFFICIENTS FOR THE INFLATION PROCESS	0.1146	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0791	0.0	0.0	0.1428	
RELATIVE PRICE RISK	1				
BOOK VALUES USED TO VALUE MORTGAGE	0				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	94.50	81.50	68.50	50.00	34.50	23.00	12.50	8.50	5.50
0.50 - 0.99	75.50	62.50	52.00	37.00	27.50	19.50	11.00	7.50	5.50
1.00 - 1.49	63.00	49.00	37.50	28.50	19.00	15.00	10.00	8.00	4.00
1.50 - 1.99	56.00	43.50	35.00	26.00	15.50	12.50	8.50	6.50	5.00
2.00 - 2.49	47.00	35.00	26.50	19.50	16.00	12.00	8.00	6.00	3.00
2.50 - 2.99	34.50	30.50	23.50	17.00	14.00	10.50	8.50	7.50	4.50
3.00 - 3.49	32.00	26.00	22.50	17.00	11.00	10.00	8.50	6.50	4.00
3.50 - 3.99	26.50	21.50	18.00	14.50	11.00	7.50	7.00	4.00	3.50
4.00 - 4.49	24.00	18.00	16.00	13.00	8.50	6.00	5.50	4.50	3.50
4.50 - 4.99	20.50	16.50	15.00	12.00	9.50	8.50	6.00	5.00	4.00
5.00 - 5.99	17.75	13.75	11.25	9.25	7.00	5.75	5.25	3.25	2.75
6.00 - 6.99	11.50	8.75	7.25	4.75	4.00	3.75	3.00	2.25	2.00
7.00 - 7.99	8.00	6.00	5.25	4.25	3.00	3.00	2.75	2.25	1.25
8.00 - 8.99	6.50	4.75	4.75	3.25	2.75	2.00	1.75	1.75	1.50
9.00 - 9.99	4.50	2.25	1.75	1.25	1.00	0.75	0.75	0.25	0.25
10.00 - 14.99	0.55	0.25	0.20	0.05	0.05	0.05	0.00	0.00	0.00
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 30 YEAR MORTGAGE.PRIME RUS.INT. DATA FRED. CHARL.

TABLE # 17(1)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.0500				
MATURITY=6 MONTHS INTERVALS	40				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	47500.00				
GRADUATION OF PAYMENTS	0.0200				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0817				
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0240	0.0	0.0	0.0260	
RELATIVE PRICE RISK	1				
BOOK VALUES USED TO VALUE MORTGAGE	0				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	100.00	99.00	59.00	5.50	0.0
0.50 - 0.99	100.00	100.00	100.00	100.00	99.50	89.00	42.00	7.50	0.0
1.00 - 1.49	100.00	100.00	100.00	100.00	98.00	75.00	39.00	8.00	0.50
1.50 - 1.99	100.00	100.00	100.00	99.00	93.00	70.50	29.50	11.50	2.00
2.00 - 2.49	100.00	100.00	99.00	94.00	89.50	60.00	27.50	8.00	1.50
2.50 - 2.99	100.00	100.00	98.50	97.00	86.00	56.00	22.50	7.00	0.50
3.00 - 3.49	100.00	100.00	98.00	94.50	78.50	48.00	19.50	5.00	1.00
3.50 - 3.99	100.00	99.00	97.00	90.00	68.50	42.50	18.00	5.00	0.50
4.00 - 4.49	100.00	99.00	96.50	86.00	59.50	35.50	14.00	4.00	0.50
4.50 - 4.99	100.00	98.50	94.50	77.50	53.00	32.50	9.50	2.50	0.50
5.00 - 5.99	98.75	93.25	83.00	61.50	36.00	15.50	6.50	1.75	0.25
6.00 - 6.99	95.25	86.75	67.25	42.25	23.25	10.75	3.50	0.75	0.25
7.00 - 7.99	86.50	71.00	48.00	26.25	14.00	6.75	2.00	0.50	0.0
8.00 - 8.99	74.00	54.50	30.00	16.75	7.50	3.50	1.25	0.25	0.0
9.00 - 9.99	55.25	33.75	19.00	9.25	4.25	1.50	0.25	0.0	0.0
10.00 - 14.99	12.45	6.65	3.65	0.90	0.45	0.20	0.00	0.00	0.00
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 30 YEAR MORTGAGE.PRIME BUS.INT. DATA FRED. CHAVI.

TABLE # 17(2)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1000					
MATURITY=6 MONTHS INTERVALS	40					
INITIAL HOUSE PRICE	50000.00					
INITIAL MORTGAGE VALUE	45000.00					
GRADUATION OF PAYMENTS	0.0200					
INITIAL INFLATION RATE	1.0511					
INITIAL INTEREST RATE	1.0817					
INITIAL INTEREST RATE FOR PAYMENTS	0.0417					
COEFFICIENTS FOR THE INFLATION PROCESS	0.1146	0.2893	0.5995	0.0104		
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0063	0.7314	0.0	0.2666	0.0	0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0240	0.0	0.0	0.0260		
RELATIVE PRICE RISK	1					
BOOK VALUES USED TO VALUE MORTGAGE	0					

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	100.00	98.00	51.50	3.00	0.0	0.0
0.50 - 0.99	100.00	100.00	100.00	100.00	90.50	44.50	5.50	0.50	0.0
1.00 - 1.49	100.00	100.00	100.00	98.00	82.00	33.00	6.50	0.0	0.0
1.50 - 1.99	100.00	100.00	99.50	94.50	73.50	26.00	6.50	0.0	0.0
2.00 - 2.49	100.00	100.00	98.00	91.50	61.00	23.50	6.00	0.50	0.0
2.50 - 2.99	100.00	100.00	97.00	85.50	50.50	17.50	5.50	2.00	0.50
3.00 - 3.49	100.00	99.50	94.00	78.00	45.50	15.50	5.50	1.50	0.50
3.50 - 3.99	100.00	98.50	90.00	70.50	37.50	14.50	5.00	1.00	0.0
4.00 - 4.49	99.50	95.50	85.00	60.00	31.50	12.00	3.50	1.00	0.0
4.50 - 4.99	99.50	93.50	80.00	53.50	27.00	12.00	3.00	1.00	0.0
5.00 - 5.99	98.50	85.75	64.75	38.75	14.00	4.25	1.50	0.50	0.0
6.00 - 6.99	88.25	72.75	43.50	20.75	8.25	2.00	0.50	0.0	0.0
7.00 - 7.99	77.00	51.50	27.50	12.50	3.00	0.25	0.0	0.0	0.0
8.00 - 8.99	50.25	32.50	17.25	5.25	0.25	0.0	0.0	0.0	0.0
9.00 - 9.99	37.00	19.00	8.00	1.25	0.0	0.0	0.0	0.0	0.0
10.00 - 14.99	6.75	2.50	0.80	0.10	0.00	0.00	0.00	0.00	0.00
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAD.PAYMENT 30 YEAR MORTGAGE,PRIME RHS,INT. DATA FMED. CHANL.

TABLE # 17(3)

PROPORTION OF INITIAL EQUITY OWNERSHIP	0.1500				
MATURITY-6 MONTHS INTERVALS	60				
INITIAL HOUSE PRICE	50000.00				
INITIAL MORTGAGE VALUE	42500.00				
GRADUATION OF PAYMENTS	0.0200				
INITIAL INFLATION RATE	1.0511				
INITIAL INTEREST RATE	1.0817				
INITIAL INTEREST RATE FOR PAYMENTS	0.0817				
COEFFICIENTS FOR THE INFLATION PROCESS	0.1166	0.2893	0.5995	0.0104	
COEFFICIENTS FOR THE INTEREST RATE PROCESS	0.0043	0.7314	0.0	0.2666	0.0 0.0079
COEFFICIENTS FOR THE RELATIVE PRICE	1.0240	0.0	0.0	0.0260	
RELATIVE PRICE RISK	1				
BOOK VALUES USED TO VALUE MORTGAGE	0				

YEAR	PROBABILITIES								
	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10
0.0 - 0.49	100.00	100.00	100.00	98.50	49.00	0.0	0.0	0.0	0.0
0.50 - 0.99	100.00	100.00	99.50	92.50	34.50	2.00	0.0	0.0	0.0
1.00 - 1.49	100.00	100.00	97.50	79.50	28.50	3.00	0.0	0.0	0.0
1.50 - 1.99	100.00	99.50	94.00	67.00	26.50	4.00	0.0	0.0	0.0
2.00 - 2.49	100.00	99.00	89.50	53.50	24.50	5.50	1.00	0.0	0.0
2.50 - 2.99	100.00	97.50	84.50	47.50	18.00	4.50	0.50	0.0	0.0
3.00 - 3.49	99.50	94.50	74.00	39.00	17.00	4.00	0.50	0.0	0.0
3.50 - 3.99	99.50	92.50	71.50	35.00	11.50	2.00	0.50	0.0	0.0
4.00 - 4.49	97.50	86.50	62.00	29.50	11.00	2.50	0.0	0.0	0.0
4.50 - 4.99	93.50	83.00	54.50	24.50	4.00	1.50	0.0	0.0	0.0
5.00 - 5.99	87.50	69.00	36.50	13.25	3.25	0.50	0.0	0.0	0.0
6.00 - 6.99	75.25	48.75	23.50	6.00	2.25	0.0	0.0	0.0	0.0
7.00 - 7.99	57.00	29.75	12.00	3.50	1.25	0.0	0.0	0.0	0.0
8.00 - 8.99	38.75	16.25	7.25	1.75	1.00	0.50	0.0	0.0	0.0
9.00 - 9.99	21.00	9.25	3.00	1.00	0.00	0.00	0.00	0.00	0.0
10.00 - 14.99	3.70	1.00	0.30	0.10	0.0	0.0	0.0	0.0	0.0
15.00 - 19.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX A

Description of Alternative Contracts

Notation

Q_t: nominal payment required at the end of the t-th period;

q_t: real payment at end of period t;

M_t: nominal debt outstanding at end of period t;

m_t: real debt outstanding at end of period t;

R_t: nominal long-term interest rate appropriate to period t;

r_t: real long-term interest rate appropriate to period t;

P_t: price level at end of period t with P_0 set equal to one;

T: original amortization period or to term to maturity;

g: fixed rate of graduation;

$\bar{R}_t$: nominal interest rate used to determine the level of interest payments in period t;

1. Equal Payment Mortgage (EPM)

Nominal payment $$Q_t = R_1 M_0 [1 - (1+R_1)^{-T}]^{-1}$$

Real payment $$q_t = Q_t / P_t$$

Nominal debt outstanding $$M_t = M_0 [1 - (1+R_1)^{1-T}] / [1 - (1+R_1)^{-T}]$$

Real debt outstanding $$m_t = M_t / P_t$$

$$t = 1, \ldots, T$$

2. Graduated Payment Mortgage (GPM)

Nominal payment $$Q_t = (1+g)^{t-1}L$$

where $$L = M_0(R_1-g)\left[1 - \left(\frac{1+R_1}{1+g}\right)^{-T}\right]^{-1}$$

Real payment $$q_t = Q_t/P_t$$

Nominal debt outstanding $$M_t = M_{t-1} - [Q_{t-1} - R_1 M_{t-1}]$$

Real debt outstanding $$m_t = M_t/P_t$$

CMHC's Graduated Payment Mortgage $(M_0/H_0 = 0.85,\ g = .05)$

3. Variable Rate Mortgage (VRM)

Nominal payment $$Q_t = \begin{cases} R_t M_{t-1}[1 - (1+R_t)^{t-T-1}]^{-1} & t < T \\ M_{T-1}(1+R_T) & t = T \end{cases}$$

Real payment $$q_t = Q_t/P_t$$

Nominal debt outstanding $$M_t = M_0 \prod_{i=1}^{t}(1+R_i) - Q_t - \sum_{i=1}^{t-1} Q_i \left[\prod_{j=i+t}^{t}(1+R_j)\right]$$

Real debt outstanding $$m_t = M_t/P_t$$

A Dual Variable Rate Mortgage (DVRM)

Nominal payment $$Q_t = \begin{cases} R_t M_{t-1}[1 - (1+R_t)^{t-T-1}]^{-1}; & t < T \\ M_{T-1}(1+R_T) \quad ; & t = T \end{cases}$$

Real payment $$q_t = Q_t/P_t$$

Nominal interest payment $I_t = \bar{R}_t M_{t-1}$

Nominal debt outstanding $M_t = M_{t-1} - (Q_t - \bar{R}_t M_{t-1})$

Real debt outstanding $m_t = M_t / P_t$

The Commerce Variable Rate Mortgage

The CVRM is similar to the dual variable rate mortgage. The interest rate charged each month is based on the Commerce Mortgage Prime Rate. Nominal payments, Q_t, are fixed for a five year period. A graduated payment option is also provided. While the normal amortization period is 25 years, this period can be negotiated. An option to switch to a conventional fixed rate mortgage is also available.

4. Price Level Adjusted Mortgage (PLAM)

Nominal payment $Q_t = P_t q_t$

Real payment $q_t = r_1 M_0 [1 - (1+r_1)^{-T}]^{-1}$

Nominal debt outstanding $M_t = P_t m_t$

Real debt outstanding $m_t = M_0 [1 - (1+r_1)^{t-T}] / [1 - (1+r_1)^{-T}]$

5. Shared Appreciation Mortgage (SAM)

In a SAM, the borrower receives a below-market interest rate in return for the lender receiving a fraction of any (nominal) capital gain on the home, either at its date of sale or a pre-arranged valuation date. From the perspective of an insurer, the only relevant issue is the extent

of the initial interest rate reduction. The lender has - in addition to a claim on a fixed stream of nominal payments - a call option on the mortgaged home, with a striking price equal to its market value at the date that the mortgage is taken out. To provide an element of realism in the SAM simulations, we made a crude calculation of the fraction of the nominal capital gain that a risk-neutral lender would demand in return for our hypothesized interest rate reduction of 4 percent. The borrower makes payments for the first 5 years at a 13 percent rather than a 17 percent interest rate. At the end of this time, the book value of the mortgage is set equal to that of an EPM taken out at the same time at the market rate of 17 percent. The fraction of the nominal capital gain that the risk-neutral lender receives is that fraction, based on the no relative price simulations, which would make him indifferent between a SAM and an EPM. For initial loan-to-value ratios of .85, .90 and .95, this fraction (or "SAM factor") is equal to .310, .329, and .347. The SAM factor is an increasing function of the loan-to-value ratio since the higher is the latter, the greater is the likelihood of default (and thus a zero value for the option) before the end of the 5-year period.

Let R_1 = market mortgage interest rate

$\bar{R}_1$ = reduced mortgage interest rate under SAM

$Q(R_1)$ = mortgage payment for an EPM based on R_1

$Q(\bar{R}_1)$ = mortgage payment for an EPM based on $\bar{R}_1$

$B_t(R_1)$ = book value at time t of an EPM with interest rate R_1

x = fraction of nominal capital gain which accrues to lender

H_t = house price at end of period t

$F(H_t)$ = cumulative distribution function of H_t

The lender must be indifferent between the expected streams of payments under the EPM and the SAM, which is readily solved for x if $F(H_t)$ is known. For annual payments, the requirement is:

$$\underset{t=1}{\overset{5}{\sum}} \frac{Q(R_1)}{(1+R_t)^t} + \frac{B_5(R_1)}{(1+R_1)^5} = \underset{t=1}{\overset{5}{\sum}} \frac{Q(\bar{R}_1)}{(1+R_1)^t} + \frac{B_5(R_1)}{(1+R_1)^5} + \frac{x}{(1+R_1)^5} \int_{H_0}^{\infty} (H_5-H_0)dF(H_5)$$

(EPM) (SAM)

APPENDIX B

Reconciliation of Findings with Simulations of Various Mortgage Designs in Canada (Working Paper prepared for the Ministerial Advisory Committee on Inflation and the Taxation of Personal Investment Income by Pouliot, Guèrard Inc., 30 September 1982).

This working paper performs historical simulations with the full data set on house prices compiled by the Royal Trust. Its purpose is to compare the potential default risk of alternative PLAM's with that of an EPM. The conclusion is stated succinctly on page 26:

> On the whole, a detailed examination of the results which are summarized below, shows that, in a wide array of cases, a modified Price Level Adjusted Mortgage (PLAM) providing for 25% capitalization of the inflation component and a 15% downpayment is a workable design that materially increases the affordability of housing for those buyers accepting its particular combination of advantages and inconveniences, without increasing the risk beyond acceptable limits.

The precise nature of the simulations conducted, and the nature of the tradeoffs so identified, is contained on page 42;

> The major conclusion to be drawn from the preceding tables is that, as a rule, a modified PLAM with 25% capitalization would be somewhat more "risky" than the conventional mortgage given an equal downpayment of 10% in both cases. This is so because loan-to-value ratios are moderately higher for such a mortgage. However, if the downpayment is increased to 15%, the loan-to-value ratio and therefore risk, is significantly decreased, even to below levels obtained for the conventional mortgages with a 10% downpayment.

> An increase in the capitalization of the inflation component to 50% could be achieved without undue risk, if the downpayment were increased to 20%. Given such a mortgage design, 98% of all mortgages maintain a loan-to-value ratio below 90%. This is in the range now deemed acceptable since conventional loans are currently issued at that level of equity.

The purpose of this Appendix is to "reconcile" the findings reported in the working paper with those presented in this study. This reconciliation is usefully done in point form.

1. Methodology

The working paper uses an historical simulation technique in which, for each possible purchase date (corresponding to a Royal Trust Survey), a house is purchased and the loan-to-value ratio then calculated at each subsequent date at which price data are recorded. The total number of loan-to-value ratios calculated for a particular purchase date thus increases, the earlier is the purchase date. The grand total of these calculated loan-to-value ratios is the centrepiece of the simulation exercise. The sample period (1974-1982) is characterized for the most part by secularly rising house prices, followed by a sharp decline in the last year or two This suggests that the number of loan-to-value ratios (as a percentage of the total) which lie above a target level will be less than if a different historical pattern of house prices were observed. As a result, this procedure is likely to make all "deferred interest" mortgages appear to be less risky than would our stochastic simulation exercises.

2. Degree of Capitalization of the Inflation Component

Our simulations are conducted for a "pure" PLAM, in which 100% of the inflation adjustment is capitalized (i.e. added to the outstanding mortgage principal). The working paper suggests (page 27), as we do, that 100% capitalization is likely to significantly raise the risk of PLAM's relative to EPM's, other things equal. The major point of the working paper is that a capitalization rate of 25%, and at most 50%, may prove to be acceptable in terms of any incremental increase in default risk relative to an EPM.

Although we simulated only the "pure" PLAM, our analysis is consistent with the finding that a lower degree of capitalization of the inflation adjustment would significantly lower default risk. When house prices are volatile, as in Vancouver, EPM's as well as PLAM's are risky. When house prices are not volatile, as in Fredericton, the PLAM is more risky than the EPM if the mean rate of inflation in house prices lags behind the inflation rate. The mean rate of price appreciation in (say) Fredericton, an annual rate of 5.2 percent, is considerably less than the mean inflation rate of 9.4 percent during our sample period. As a result, our study shows that the default risk of a PLAM with 100% capitalization rises secularly over time. If only 25% of the inflation rate were capitalized, a revised simulation would no longer show that default risk rises over time in local markets like Fredericton where house price appreciation - although positive - has been less than the overall inflation rate. There is no inconsistency between the two studies on this point, although the methodology employed in the working paper is likely to present the PLAM in more favourable light for the reasons cited in point one.

3. The Volatility of the Relative Price of Housing

As must be the case since the same data set was employed, both studies indicate that house prices in local housing markets do not track the contemporaneous inflation rate so closely as many observers might expect. We emphasize this point in the main text of our report. The fact that both mean rates of price appreciation and the variability of price movements around their means differ across markets merits additional emphasis. If prices are volatile, EPM's as well as all "deferred interest" mortgages will be risky. If mean rates of appreciation are less than the inflation rate, EPM's need not be risky, although "deferred interest" mortgages might be. In this latter case, the decision to capitalize only a fraction (say, 25%) of the inflation adjustment of a PLAM may not result in a significant increase in default risk relative to an EPM even if initial loan-to-value ratios are the same.

Finally, both studies have two additional implications. First, because of the diversity of price behaviour across local housing markets, the default risk of any hypothetical mortgage contract will not be constant across markets. This implies, in turn, that uniform insurance premiums if established by the CMHC will undoubtedly involve cross-subsidies. Only if one believes that future price movements in a particular market are well predicted by past price movements, however, will one be able to determine in advance where the cross-subsidies are likely to occur. Secondly, there is little to be gained for analytical purposes by measuring and subsequently monitoring an aggregate index of house prices. Substantial diversity of price movements across local markets does exist, and the construction and use of such an index might obscure this important point.